

Serial No.: 10/765,309

Examiner: M. Stahl

Title: OPTICAL ELEMENT, OPTICAL CIRCUIT PROVIDED WITH THE OPTICAL ELEMENT, AND METHOD FOR PRODUCING THE OPTICAL ELEMENT

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Amendments to the Specification

Please replace the paragraph beginning on line 10 of page 5 with the following amended paragraph:

An optical element of the present invention includes a structure having at least one convex portion and at least one concave portion formed so as to be adjacent to one of the convex portions, at least one surface of the structure being covered, the optical element having a hollow portion, wherein the at least one surface of the structure is covered with a covering layer formed by a deposition process. According to this configuration, a hollow portion in a desired shape can be produced. Furthermore, an optical element thus produced is very small with a low loss. Furthermore, the structure is covered with the covering layer, so that an optical element with high durability is realized. As the deposition process, general chemical vapor deposition (DVD) (including plasma CVD) desirably is used. Furthermore, physical vapor deposition (PVD), ~~frame~~ flame hydrolysis deposition (FHD), and the like also can be used. It is desirable to use a method that basically has no directivity in a deposition process and has a relatively high deposition rate or to adapt a method to promote such a condition.

Please replace the paragraph beginning on line 26 of page 15 with the following amended paragraph:

In the optical element 1 of Embodiment 1, as a method for forming the covering layer 14 so as to cover the structure 10, general chemical vapor deposition (including plasma CVD) desirably is used. Furthermore, physical vapor deposition (PVD), ~~frame~~ flame hydrolysis deposition (FHD), and the like also can be used. It is desirable to use a method that basically has no directivity in a deposition process and has a relatively high deposition process speed or to adapt a method to promote such a condition. As a material for the covering layer 14, it is desirable to use a silica material because of high

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stability and low refractive index. In the case where a multi-layered film is formed in a direction vertical to the substrate 18 surface, it is preferable to use a material suitable for each application in view of a refractive index and a transmittance.